Claims:

1. A method of treating hollow anatomical structures, for example varicose veins, comprising:

providing an applicator, the applicator comprising an elongate member and including an emitter, the emitter being coupled to a source of microwave radiation and being adapted to emit said radiation;

introducing the elongate member into a hollow anatomical structure, the hollow anatomical structure including a section of target tissue;

traversing the elongate member past the section of target tissue at a controlled rate while said emitter emits microwave radiation of a predetermined intensity into said section.

2. The method of claim 1, wherein the hollow anatomical structure is a vein, and said section of target tissue comprises a section of varicose tissue.

3. The method of claim 1 or 2, wherein the traversing is performed at a predetermined rate, for example at a predetermined constant rate.

4. The method of claim 3, wherein said predetermined constant rate is about 2.5mm per second.

5. The method of any of claims 1 to 4, wherein the applicator is mounted on the end of a flexible elongate meter said elongate meter having a series of regularly spaced markings along its length; and

said traversing is performed while a series of equally time-spaced audible tones is emitted; and

and said traversing is performed by a user at a rate such that each of said markings become visible to the user in time with a respective one of said audible tones.

6. The method of claim 5, wherein the markings are non-regularly spaced instead of regularly spaced.

7. The method of claim 5 or 6, wherein the audible tones are non-equally time spaced instead of equally time-spaced.

8. The method of claim 5, 6 or 7, wherein said traversing step is performed by withdrawing the applicator from the hollow anatomical structure by the user pulling on the elongate meter, thereby exposing said markings.

9. The method of claim 5, 6 or 7, further comprising:

providing a motion sensor, for example an optical sensor, positioned to sense the motion of the meter, and

providing a controller, for example a computer, coupled to the motion sensor,

wherein said traversing step is performed by withdrawing the applicator from the hollow anatomical structure by pulling on the elongate meter, wherein during said pulling step the controller issues audible and/or visible indications to the user, and wherein said audible and/or visible indications indicate that the speed of withdrawal of the applicator is too slow, or is too fast, or is correct.

10. The method of claim 9, further comprising:

providing a mechanical actuator, the mechanical actuator being coupled to the controller and adapted to impart translational motion to the elongate meter,

wherein said pulling is provided by driving the mechanical actuator, under the control of the controller and/or the user, to impart said translational motion and thereby withdraw said elongate member.

11. The method of claim 9 or 10, further comprising:

providing a drum;

wherein said step of pulling on the elongate meter includes winding the elongate meter onto said drum.

12. The method of any of the preceding claims, wherein the traversing step is preceded by the step of moving the elongate member in a first direction along the vein until the emitter has passed beyond said section of target tissue, and the traversing step is performed by the user withdrawing the elongate member in a second direction, opposite to said first direction.

13. The method of any claims 5 to 12, wherein the markings comprise alternately light and dark coloured sections.

14. The method of claim 13, wherein the light and dark coloured sections are each about 1 cm long.

15. The method of any claims 5 to 14, wherein the elongate member is coupled to the source of radiation via a coaxial cable, and the markings are provided on the exterior surface of the coaxial cable.

16. The method of any of the preceding claims, wherein said predetermined intensity of microwave radiation is about 1.1 to 1.4 W per mm of circumference of the elongate member, whereby said emission of radiation achieves occlusion of said section of target tissue during said traversing step.

17. The method of any of the preceding claims, wherein a temperature sensor is provided on said elongate member, and the method further includes monitoring a temperature provided by the sensor and indicative of the temperature of the section of varicose tissue during said traversing step.

18. The method of claim 17, further including stopping the emission of said microwave radiation if the temperature sensed by said sensor is at or above a predetermined level.

19. The method of any of the preceding claims, further comprising:

providing a motion rate sensor for detecting the rate of movement of the applicator;

providing a control unit coupled to the sensor for receiving the motion rate signals output thereby;

operating the control unit to

calculate the speed of motion of the applicator, and

control the amount of radiation supplied to the applicator and/or the rate of motion of the applicator in dependence upon said calculated speed of motion.

20. The method of claim 19, wherein the step of calculating the speed of motion of the applicator comprises:

polling the sensor, the polling interval between successive polls being of uniform duration;

determining a difference value, the difference value being a difference between counts defined by successive motion rate signals;

using the determined difference value and a conversion factor R, calculating the speed of motion of the applicator using R and the difference value.

21. The method of claim 19 or 20, wherein step of calculating the speed of motion v comprises using

$$v = (c_i - c_{i-1})R$$

where $(c_i - c_{i-1})$ is the difference value.

22. The method of any of claims 19 to 21, wherein the applicator is mounted on the end of an elongate cable, and the speed of motion of the applicator is calculated by calculating the speed of motion of the cable.

23. The method of claim 22, wherein the polling interval between successive polls is T, and the conversion factor is determined as R = 1/KT, where K is a predetermined count conversion constant for the cable.

24. The method of any of claims 19 to 23, further including:

providing a display device; and

displaying, under the control of the control unit, the calculated speed of motion of the applicator.

25. The method of claim 24, wherein the display device is adapted to display, under the control of the control unit, a graphical representation of the calculated speed of motion of the applicator.

26. The method of claim 25, wherein said graphical representation comprises a speedometer-like graphical representation.

27. The method of any of claims 22 to 26, wherein the motion rate sensor comprises:

a housing relative to which, in use, the cable moves; and

a detection unit disposed within the housing, the detection unit including a conversion device adapted for generating detector signals caused by the motion of the cable, and processing circuitry adapted for receiving said detector signals and outputting motion signals indicative of the rate of movement of the cable.

28. The method of claim 27, wherein the housing includes at least one aperture permitting motion of the cable relative to the housing.

29. The method of claim 28, wherein the housing has a configuration whereby, in use, the movement of the cable in or near the housing is substantially linear.

30. The method of claim 28 or 29, wherein said at least one aperture includes an entry aperture through which, in use, the cable enters the housing, and an exit aperture through which, in use, the cable exits the housing, the cable preferably moving, in use, in a substantially linear path between said entry aperture and exit aperture.

31. The method of any of claims 27 to 30, wherein the conversion device comprises of at least one radiation detector adapted for receiving radiation from the cable and generating detector signals in dependence on said received radiation.

32. The method of claim 31, wherein the radiation is optical radiation, the detection unit further includes an optical emitter for emitting the optical radiation, and the radiation detector is disposed so as to receive said optical radiation after reflection from the cable.

33. The method of claim 32, wherein the optical emitter is a LED, and preferably wherein the optical emitter and radiation detector comprise an integral device.

34. The method of any of claims 31 to 33, wherein the cable has a plurality of markings or reflective elements disposed on the surface thereof in a repetitive pattern along its length.

35. The method of claim 31, wherein the radiation detector comprises a detector of low-level radioactivity, and the cable has a plurality of radioactive elements disposed therein or thereon in a repetitive pattern along its length.

36. The method of any of claims 27 to 30, wherein the conversion device includes a magnetic detector, and the cable has a plurality of magnetic elements disposed therein or thereon in a repetitive pattern along its length, the magnetic detector being adapted to generate said detector signals when the cable, in use, moves past the magnetic detector.

37. The method of any of claims 27 to 30, wherein the conversion unit includes

one or more rotatable members, such as one or more wheels or balls, adapted to contact the cable and be rotated thereby, in use, and

an electromechanical device adapted to generate said detector signals in dependence upon the rate of rotation of said rotatable member(s).

38. A method of treating hollow anatomical structures substantially as hereinbefore described with reference to the accompanying drawings.

39. An applicator for applying radiation to hollow anatomical structures, for example varicose veins, comprising:

an elongate member, the elongate member including an emitter, the emitter being coupled to a source of microwave radiation and being adapted to emit said radiation;

wherein the emitter includes

a radiation emitting portion made of dielectric material and having an axis of elongation, and

an elongate conductor within and extending at least partially along the radiation emitting portion,

the radiation emitting portion being shaped and dimensioned so as to emit said radiation at a predetermined intensity in a field of limited dimensions adjacent thereto, whereby occlusion of the tissue of a hollow anatomical structure within said field is effectively accomplished.

40. The applicator of claim 39, wherein the radiation emitting portion includes a generally conical tapering portion, the tapering portion thereby forming a tip for insertion into a hollow anatomical structure.

41. The applicator of claim 40, wherein the elongate conductor extends along the entire length of the radiation emitting portion, whereby said field is disposed, in use, substantially around said tip.

42. The applicator of claim 40, wherein the elongate conductor extends partially along the length of the radiation emitting portion, whereby said field is disposed, in use, substantially around the midsection of said radiation emitting portion and spaced apart from said tip.

43. The applicator of any of claims 39 to 42, wherein a temperature sensor is provided on said elongate member, said temperature sensor preferably comprising a thermocouple or a fibre optic sensor.

44. The applicator of any of claims 39 to 43, wherein the elongate member is coupled to the source of radiation via a coaxial cable, and a portion of said cable in abutment with the radiation emitting portion is surrounded by, and attached thereto, by a conductive ferrule; and

wherein the temperature sensor is disposed on the ferrule.

45. The applicator of claim 44, wherein a series of regularly spaced markings are provided on the exterior surface of the coaxial cable along its length.

46. The applicator of claim 44, wherein the markings are non-regularly spaced instead of regularly spaced.

47. The applicator of claim 45 or 46, wherein the markings comprise alternately light and dark coloured sections.

48. The applicator of claim 47, wherein the light and dark coloured sections are each about 1 cm long.

49. The applicator of any of claims 40 to 48, wherein radiation emitting portion includes a substantially cylindrical portion integral with the tapering portion.

50. The applicator of any of claims 44 to 49 wherein said elongate conductor comprising a portion of the inner conductor of a coaxial cable protruding axially beyond the outer casing of said cable.

51. An applicator for applying radiation to hollow anatomical structures, substantially as hereinbefore described with reference to the accompanying drawings.

52. A system for the treatment of hollow anatomical structures, comprising:

an applicator according to any of claims 39 to 51; and

a motion rate sensor arranged, in use, for detecting the rate of movement of the applicator;

a control unit coupled to the sensor for receiving the motion rate signals output thereby;

wherein the control unit is configured to

calculating the speed of motion of the applicator using said motion rate signals, and

control the amount of radiation supplied to the applicator and/or the rate of motion of the applicator in dependence upon said calculated speed of motion.

53. The system of claim 52, wherein, for calculating the speed of motion of the applicator, the control unit is configured to

poll the sensor, the polling interval between successive polls being of uniform duration;

determine a difference value, the difference value being a difference between counts defined by successive motion rate signals;

using the determined difference value and a conversion factor R, calculating the speed of motion of the applicator using R and the difference value.

54. The system of claim 52 or 53, wherein the speed of motion is calculated using

$$v = (c_i - c_{i-1})R$$

where $(c_i - c_{i-1})$ is the difference value.

55. The system of any of claims 52 to 54, wherein the applicator is mounted on the end of an elongate cable, and the speed of motion of the applicator is calculated by calculating the speed of motion of the cable.

56. The system of claim 55, wherein the polling interval between successive polls is T, and the conversion factor is determined as R = 1/KT, where K is a predetermined count conversion constant for the cable.

57. The system of any of claims 52 to 56, wherein the system fürther includes a display device adapted to display, under the control of the control unit, the calculated speed of motion of the applicator.

58. The system of claim 57, wherein the display device is adapted to display, under the control of the control unit, a graphical representation of the calculated speed of motion of the applicator.

59. The system of claim 58, wherein said graphical representation comprises a speedometer-like graphical representation.

60. The system of any of claims 52 to 59, wherein the motion rate sensor comprises

a housing relative to which, in use, the cable moves,

a detection unit disposed within the housing, the detection unit including

a conversion device adapted for generating detector signals caused by the motion of the article, and

processing circuitry adapted for receiving said detector signals and outputting motion signals indicative of the rate of movement of the article.

61. The sensor of claim 60, wherein the housing includes at least one aperture permitting motion of the cable relative to the housing.

62. The sensor of claim 61, wherein the housing has a configuration whereby, in use, the movement of the cable in or near the housing is substantially linear.

63. The sensor of claim 61 or 62, wherein said at least one aperture includes an entry aperture through which, in use, the cable enters the housing, and an exit aperture through which, in use, the cable exits the housing, the cable preferably moving, in use, in a substantially linear path between said entry aperture and exit aperture.

64. The sensor of any of claims 60 to 63, wherein the conversion device comprises of at least one radiation detector adapted for receiving radiation from the cable and generating detector signals in dependence on said received radiation.

65. The sensor of claim 64, wherein the radiation is optical radiation, the detection unit further includes an optical emitter for emitting the optical radiation, and the radiation detector is disposed so as to receive said optical radiation after reflection from the cable.

66. The sensor of claim 65, wherein the optical emitter is a LED, and preferably wherein the optical emitter and radiation detector comprise an integral device.

67. The sensor of any of claims 64 to 66, wherein the cable has a plurality of markings or reflective elements disposed on the surface thereof in a repetitive pattern along its length.

68. The sensor of claim 64, wherein the radiation detector comprises a detector of low-level radioactivity, and the cable has a plurality of radioactive elements disposed therein or thereon in a repetitive pattern along its length.

69. The sensor of any of claims 60 to 63, wherein the conversion unit includes a magnetic detector, and the cable has a plurality of magnetic elements disposed therein or thereon in a repetitive pattern along its length, the magnetic detector being adapted to generate said detector signals when the cable, in use, moves past the magnetic detector.

70. The sensor of any of claims 60 to 63, wherein the conversion unit includes

one or more rotatable members, such as one or more wheels or balls, adapted to contact the cable and be rotated thereby, in use, and

an electromechanical device adapted to generate said detector signals in dependence upon the rate of rotation of said rotatable member(s).

71. A system for the treatment of hollow anatomical structures, substantially as hereinbefore described with reference to the accompanying drawings.